CLAIMS.

1. A chemical compound having formula I:

## 5 wherein:

R is selected from the group comprising alkyl, aryl and alkylaryl;

R' and R" are independently selected from the group comprising H, alkyl and alkylaryl, or R' and R" together form an alkylene chain so as to provide, together with the C atom to which they are attached, a cyclic system;

10 Q is selected from the group comprising -O- and -CH<sub>2</sub>-;

X and Y are independently selected from the group comprising H, F, Cl, Br, I, OH and methyl (-CH<sub>3</sub>);

Ar is a monocyclic aromatic ring moiety or a fused bicyclic aromatic ring moiety, either of which said ring moieties is carbocyclic or heterocyclic and is optionally substituted;

15 Z is selected from the group comprising H, alkyl and halogen; and n is 0 or 1,

wherein when n is 0, Z' is -NH<sub>2</sub> and a double bond exists between position 3 and position 4, and

when n is 1, Z' is =0;

or a pharmaceutically acceptable derivative or metabolite of a compound of formula I; with the proviso that, except where R is 2-Bu (-CH<sub>2</sub>-CH(CH<sub>3</sub>)<sub>2</sub>) and one of R' and R" is H and one of R' and R" is methyl (-CH<sub>3</sub>), when n is 1 and X and Y are both H, then Ar is not unsubstituted phenyl (-C<sub>6</sub>H<sub>5</sub>).

WO 2005/012327 PCT/GB2004/003148

- 2. A compound according to claim 1 wherein R is selected from the group comprising a  $C_{1-16}$  primary or secondary alkyl group, a  $C_{5-7}$  carbocyclic aryl group or a  $C_{1-6}$  alkyl $C_{5-11}$  aryl group.
- 5 3. A compound according to claim 2 wherein R is selected from the group comprising methyl (-CH<sub>3</sub>), ethyl (-C<sub>2</sub>H<sub>5</sub>) and benzyl (-CH<sub>2</sub>C<sub>6</sub>H<sub>5</sub>).
  - 4. A compound according to claim 3 wherein R is benzyl.
- 10 5. A compound according to any one of the preceding claims wherein Ar is an optionally substituted C<sub>6</sub> monocyclic aromatic ring moiety, ie is optionally substituted phenyl.
- 6. A compound according to claim 5 wherein Ar is selected from the group comprising -C<sub>6</sub>H<sub>5</sub>, pCF<sub>3</sub>C<sub>6</sub>H<sub>4</sub>-, pFC<sub>6</sub>H<sub>4</sub>-, pNO<sub>2</sub>C<sub>6</sub>H<sub>4</sub>-, pClC<sub>6</sub>H<sub>4</sub>- and oClC<sub>6</sub>H<sub>4</sub>-.
  - 7. A chemical compound having formula II:

wherein n, Q, R, R', R", X, Y, Z and Z' have the meanings described in claim 1, and 20 additionally R can be H, with provisos that:

when n is 1, X and Y are both H, R is methyl (-CH<sub>3</sub>), one of R' and R" is H and one of R' and R" is methyl (-CH<sub>3</sub>), then Z is not -CH=CHBr;

when n is 1, X and Y are both H, R is methyl (-CH<sub>3</sub>), one of R' and R" is H and one of R' and R" is phenylethyl, phenylmethyl, indol-3-ylmethyl or indol-3-ylethyl, then Z is not F; and

25 and when n is 0, X is not H.

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- A compound according to any one of the preceding claims wherein R' and R" are, independently, selected from the group comprising H, C<sub>1-6</sub> primary, secondary and tertiary alkyl, C<sub>1-3</sub>alkylC<sub>5-7</sub> aryl, or, when together they form an alkylene chain, they provide,
   together with the C atom to which they are attached, a C<sub>3-8</sub> carbocyclic aliphatic ring.
  - 9. A compound according to claim 8 wherein R' and R" are, independently, selected from the group comprising H, methyl, benzyl and -CH<sub>2</sub>CH(CH<sub>3</sub>)<sub>2</sub>, or, R' and R" together with the C atom to which they are attached, provide a C<sub>5-6</sub> ring.

10. A compound according to claim 9 wherein R' and R" are each methyl.

- 11. A compound according to claim 9 wherein one of R' and R" is H and one of R' and R" is methyl.
- 12. A compound according to claim 9 wherein the carbocyclic ring is a pentyl ring.
- 13. A compound according to any one of the preceding claims wherein R' and R" correspond to the side chains of a naturally occurring amino acid.
- 14. A compound according to any one of the preceding claims wherein Z is selected from the group comprising H,  $C_{1-6}$ alkyl, substituted  $C_{1-6}$ alkyl,  $C_{1-6}$ alkenyl, substituted  $C_{1-6}$ alkenyl,  $C_{1-6}$ alkynyl, and halogen.
- 25 15. A compound according to any one of the preceding claims wherein Q is O.
  - 16. A compound according to any one of the preceding claims wherein when n is 1, each of X and Y is H.
- 30 17. A compound according to any one of claims 1 to 15 wherein when n is 0, each of X and Y is F.

WO 2005/012327 PCT/GB2004/003148

- A compound according to any one of claims 1 to 15 wherein when n is 0, X is OH 18. and Y is H.
- A compound according to any one of claims 1 to 15 wherein when n is 0, X is H 19. and Y is OH.
  - A compound selected from the group comprising: 20.
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(ethoxy-L-alaninyl)]-phosphate (CPF 3)
- 10 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(benzoxy-L-alaninyl)]-phosphate (CPF 2)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(methoxy-L-alaninyl)]phosphate (CPF 5)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(ethoxy-L-alaninyl)]-
- 15 phosphate (CPF 6)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(benzoxy-L-alaninyl)]phosphate (CPF 7)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(methoxy-L-alaninyl)]phosphate (CPF 10)
- 20 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(ethoxy-L-alaninyl)]phosphate (CPF 9)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(benzoxy-L-alaninyl)]phosphate (CPF 8)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[para-(trifluoromethyl)-phenyl-(methoxy-L-
- 25 alaninyl)]-phosphate (CPF 15)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[para-(trifluoromethyl)-phenyl-(ethoxy-Lalaninyl)]-phosphate (CPF 25)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-trifluorophenyl-(benzoxy-L-alaninyl)]phosphate (CPF 4)
- 30 (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(methoxy-L-alaninyl)]phosphate (CPF 13)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(ethoxy-L-alaninyl)]-phosphate (CPF 11)

- (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(benzoxy-L-alaninyl)]-phosphate (CPF 12)
- (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[phenyl-(methoxy- $\alpha$ , $\alpha$ -dimethylglycinyl)]-phosphate (CPF 26)
- 5 (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[phenyl-(ethoxy-α,α-dimethylglycinyl)]-phosphate (CPF 27)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[phenyl-(benzoxy- $\alpha$ , $\alpha$ -dimethylglycinyl)]-phosphate (CPF 14)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-nitrophenyl-(methoxy- $\alpha$ , $\alpha$ -
- 10 dimethylglycinyl)]-phosphate (CPF 45)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-nitrophenyl-(ethoxy- $\alpha$ , $\alpha$ -dimethylglycinyl)]-phosphate (CPF 46)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-nitrophenyl-(benzoxy- $\alpha$ , $\alpha$ -dimethylglycinyl)]-phosphate (CPF 47)
- 15 (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(methoxy-α,α-dimethylglycinyl)]-phosphate (CPF 42)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(ethoxy- $\alpha$ ,  $\alpha$ -dimethylglycinyl)]-phosphate (CPF 43)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[4-chlorophenyl-(benzoxy- $\alpha$ , $\alpha$ -
- 20 dimethylglycinyl)]-phosphate (CPF 44)
  - (E)-5-(2-bromovinyl)-2'-deoxyuridine-5'-[para-(trifluoromethyl)-phenyl-(benzoxy- $\alpha$ , $\alpha$ -dimethylglycinyl)]-phosphate (CPF 48)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(methoxy-α,α-cycloleucinyl)]-phosphate (CPF 16)
- 25 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(ethoxy-α,α-cycloleucinyl)]-phosphate(CPF 17)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(benzoxy-α,α-cycloleucinyl)]-phosphate (CPF 18)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(methoxy- $\alpha$ , $\alpha$ -
- 30 cycloleucinyl)]-phosphate (CPF 19)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(ethoxy-α,α-cycloleucinyl)]-phosphate (CPF 20)

- (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(benzoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 21)
- (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(methoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 22)
- 5 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(ethoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 23)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-fluorophenyl-(benzoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 24)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-chlorophenyl-(methoxy- $\alpha$ , $\alpha$ -
- 10 cycloleucinyl)]-phosphate (CPF 32)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-chlorophenyl-(ethoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 33)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(methoxy-L-phenylalaninyl)]-phosphate (CPF 36)
- 15 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-chlorophenyl-(benzoxy-α,α-cycloleucinyl)]-phosphate (CPF 34)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-trifluorophenyl-(methoxy- $\alpha$ , $\alpha$ -cycloleucinyl)]-phosphate (CPF 28)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-trifluorophenyl-(ethoxy- $\alpha$ ,  $\alpha$ -
- 20 cycloleucinyl)]-phosphate (CPF 29)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-trifluorophenyl-(benzoxy-α,α-cycloleucinyl)]-phosphate (CPF 30)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(methoxy-L-phenylalaninyl)]-phosphate (CPF 36)
- 25 (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(methoxy-L-leucinyl)]-phosphate (CPF 35)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(benzoxy-L-leucinyl)]-phosphate (CPF 37)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-nitrophenyl-(benzoxy-L-leucinyl)]-
- 30 phosphate (CPF 38)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[para-chlorophenyl-(benzoxy-L-leucinyl)]-phosphate (CPF 39)
  - (E)-5-(2-Bromovinyl)-2'-deoxyuridine-5'-[phenyl-(2-butyl-L-alaninyl)]-phosphate

WO 2005/012327 PCT/GB2004/003148

117

Gemcitabine-[phenyl-(benzoxy-L-alaninyl)]-phosphate (CPF 31)
Gemcitabine-[para-chlorophenyl-(benzoxy-L-alaninyl)]-phosphate (CPF 40) and
Gemcitabine-[para-chlorophenyl-(benzoxy-α,α-dimethylglycinyl)]-phosphate (CPF 41).

- 5 21. A compound according to any one of claims 1 to 6, claim 20, or to any one of claims 8 to 19 as dependent on any one of claims 1 to 6, for use in a method of treatment, preferably in the prophylaxis or treatment of cancer, with the proviso that when n is 1, X and Y are both H, one of R' and R" is H and one of R' and R" is methyl (CH<sub>3</sub>), R is 2-Bu (-CH<sub>2</sub>-CH-(CH<sub>3</sub>)<sub>2</sub>) or R is benzyl (-CH<sub>2</sub>C<sub>6</sub>H<sub>5</sub>), then Ar can be unsubstituted phenyl (-C<sub>6</sub>H<sub>5</sub>).
- 22. Use of a compound according to any one of claims 1 to 6, claim 20, or to any one of claims 8 to 19 as dependent on any one of claims 1 to 6, in the manufacture of a medicament for the prophylaxis or treatment of cancer, with the proviso set out in claim 15 21.
- 23. A method of prophylaxis or treatment of cancer comprising administration to a patient in need of such treatment an effective dose of a compound according to any one of claims 1 to 6, claim 20, or to any one of claims 8 to 19 as dependent on any one of claims 1
  20 to 6, with the proviso set out in claim 21.
  - 24. A pharmaceutical composition comprising a compound according to any one of claims 1 to 6, claim 20, or to any one of claims 8 to 19 as dependent on any one of claims 1 to 6, in combination with a pharmaceutically acceptable carrier, diluent or excipient.

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25. A method of preparing a pharmaceutical composition comprising the step of combining a compound according to any one of claims 1 to 6, claim 20 or any one of claims 8 to 19 as dependent on any one of claims 1 to 6, with a pharmaceutically acceptable excipient, carrier or diluent.

26. A process for the preparation of a compound of formula I according to claim 1, the process comprising reacting of a compound of formula (III):

$$\begin{array}{c} Z' \\ X \\ Y \\ Y \\ Y \\ \end{array}$$

$$\begin{array}{c} Z' \\ X \\ Y \\ \end{array}$$

$$\begin{array}{c} Z' \\ Y \\ Y \\ \end{array}$$

$$\begin{array}{c} Z' \\ Y \\ Y \\ Y \\ Y \\ Y \\$$

5 with a compound of formula (IV)

wherein Ar, n, Q, R, R', R", X, Y, Z' and Z" have the meanings described in claim 1.

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